SB761
U757
#83-11

United States
Department of
Agriculture
**Forest
Service**
Southwestern
Region

Forest Pest Management Report

R-3 83-11

BIOLOGICAL EVALUATION
Dwarf Mistletoe

El Rito Ranger District
Carson National Forest
New Mexico

April 1983

MAY 2 1983

ROCKY MOUNTAIN STATION

3430

R-3 83-11

BIOLOGICAL EVALUATION
Dwarf Mistletoe

El Rito Ranger District
Carson National Forest
New Mexico

April 1983

USDA Forest Service, Southwestern Region
State and Private Forestry
Forest Pest Management
517 Gold Avenue, SW
Albuquerque, New Mexico 87102

PREPARED BY:

for Robert E. Wood

JEROME S. BEATTY, Plant Pathologist
Forest Pest Managment

APPROVED BY:

Douglas L. Parker

DOUGLAS L. PARKER
Director of Forest Pest Management

ABSTRACT

In 1982, a dwarf mistletoe incidence and intensity survey was conducted on approximately 7,300 acres of ponderosa pine type on the El Rito Ranger District, Carson National Forest, New Mexico. Twelve stands, containing about 1,600 acres, are rated as having a high priority for dwarf mistletoe suppression. High levels of infection in both the overstory and understory components of these stands are causing severe losses when compared to healthy stands. If treatment is delayed, the use of natural regeneration harvest methods is precluded. Management alternatives and a recommendation are presented and discussed in this report.

INTRODUCTION

During the summer of 1982, a field survey crew from the El Rito Ranger District, trained and funded by Forest Pest Management (FPM), surveyed approximately 7,300 acres of ponderosa pine to gather data on the incidence and severity of southwestern dwarf mistletoe (SWDM) in these stands. After analyzing the field data, District personnel identified 12 stands, about 1,600 acres, as candidates for a possible control project. These stands were rated as high priority stands for control because of the high levels of SWDM in both the overstory and understory components and because the stands are not scheduled for management entry for another 20 years.

Estimates of the increase in spread and intensification of the parasite over the next 20 years were made using a growth and yield model for southwestern ponderosa pine. Those estimates showed that it would be practically impossible to use natural regeneration harvesting methods in these stands unless dwarf mistletoe control was undertaken immediately.

TECHNICAL AND BIOLOGICAL INFORMATION

Pathogen. Southwestern dwarf mistletoe, Arceuthobium vaginatum subsp. cryptopodum (Engelm.) Hawks. and Wiens.

Host. Southwestern ponderosa pine, Pinus ponderosa var. scopulorum Engelm.

Dwarf mistletoes are seed-bearing parasitic plants that infect a wide variety of Western conifers. As parasites, they affect host metabolism by appropriating water and nutrients. Heavily infected trees suffer a significant decease in radial growth, are more susceptible to bark beetle attacks and environmental stresses, and also produce fewer cones with smaller numbers of viable seeds than uninfected tress (Hawksworth 1961). Dwarf mistletoes spread by explosively released seeds which land on the needles and small branches of trees and infect susceptible hosts. Spread of dwarf mistletoe is most rapid and efficient from an infected overstory to a susceptible understory; therefore, the first and most important step in the treatment of an

infected two-storied stand is to remove the infected overstory. Based upon the biology of the pathogen, the shelterwood system is the most common and successful method of regeneration in stands of SWDM-infected ponderosa pine in the Southwest (Schubert 1974). If the understory is also heavily infected, it should be destroyed during site preparation to insure that no infected trees remain to continue the infestation in the new stand. In order for this system to work, there must be enough mistletoe-free overstory trees left to provide the shelter and seed source needed.

METHODS

Data were collected using the R-3 Timber Stand Examination (TSE) field procedures (Forest Service 1982). A series of combined variable (20 BAF) and fixed-area (1/100 acre) plots were established in each stand on an 8- by 8-chain grid, and measurements of tree age, d.b.h., height, and SWDM rating were made for all live, tallied ponderosa pines at each point. These individual tree measurements were then grouped into overstory (trees $\geq$ 9.0 inches d.b.h.) and understory (trees > 4.5 feet tall and $\leq$ 8.9 inches d.b.h.) categories and averaged for each stand. Estimates of the numbers of trees per acre in the overstory and understory and each stand's site index (Minor 1964) were obtained from the TSE data printouts. Average stand dwarf mistletoe ratings (DMR) (Hawksworth 1977) were converted to a percentage of trees infected (PINF) by using the formula: $PINF = \frac{\log DMR + 0.9465}{0.0165}$ (Edminster 1978). The stand parameters listed above were used as imput variables into a simulated yield growth model for southwestern ponderosa pine, RMYLD (Edminster 1978), in order to compare the yield results of the different management alternatives. Because RMYLD includes the effect of various levels of infection on the volume yields of each stand, different alternatives for SWDM control were also examined.

RESULTS

The results of the timber stand examinations for the 12 stands are summarized in table 1. In all of the stands, more than one-half of the overstory trees were infected to some degree with SWDM. Of the 12 stands, the understory was uninfected in only 3; unfortunately, these were also the stands with the lowest average number of trees per acre. In fact, none of the stands had enough uninfected trees per acre to be considered adequately stocked, and, to compound the problem, these trees are not evenly distributed thoughout the stand, but are concentrated in openings.

Conditions such as these are common in ponderosa pine stands in the Southwest and substantially increase the difficulty and cost of dwarf mistletoe control. The smaller, presently unmerchantable trees are not numerous enough to provide an adequate number of potential crop

trees for the next rotation. The time and effort needed to identify infected and uninfected trees increase the cost of sanitation cuts; in fact, the easiest and most cost-effective method of regenerating a healthy stand is to eliminate all the unmerchantable trees and begin the next rotation with an even-aged, healthy crop of naturally regenerated seedlings.

MANAGEMENT ALTERNATIVES AND DISCUSSION

Three alternatives, differing in timing of regeneration cuts and emphasis on SWDM control, were developed and analyzed in order to determine the one which best fit three criteria; SWDM control, volume production over the next rotation, and ease of regeneration. Benefit-cost analyses of the alternatives will be done by District personnel before final selection of an alternative. The three alternatives and a general description of each are:

No Action--Maintain Present Managment. All stands would be harvested and regenerated by the shelterwood method at the next scheduled entry, approximately 20 years from now. Growth losses and possible mortality caused by SWDM, acting alone or as part of a complex with insects and other diseases, would be accepted. Advance regeneration would be infected and the parasite would cause additional losses in the next rotation.

Delayed Action--Treat Infected Stands During the Next Scheduled Entry. Although this alternative recognizes the need for SWDM control, it delays it until the scheduled entry 20 years from now. As a result, heavily infected, sparsely stocked understories will be eradicated along with the overstories, and the sites planted with ponderosa pine. Where possible, understories will be thinned using marking guides designed to maximize growth and remove as much SWDM as possible. As the dwarf mistletoe infection continues to increase in severity during the next 20 years, the stands would be under increasing stress and more susceptible to bark beetle attack. The parasite would continue to intensify within the infected stands and spread into adjacent uninfected or lightly infected ones.

Immediate Dwarf Mistletoe Suppression. Under this alternative, the 12 stands would be harvested and regenerated immediately (1983-84) using the seed-tree method. The infested, unmerchantable trees would be eliminated using a combination of mechanical site preparation and prescribed burning. Seed trees would be free of visible dwarf mistletoe infections, and after regeneration is established, these trees would be removed. Because of the possibility of latent infections in the seed trees and missed infected unmerchantable trees, a special effort would be made to discriminate against any infected trees found when the planned precommerical thinning is done.

This alternative would insure that the naturally regenerated stands are free of dwarf mistletoe and that the sites would produce yields close to their biological potential. Yields would not only be

higher than those from infested stands, but would also be available approximately 17 years earlier than if control is not done.

The results of the simulation runs produced by RMYLD for the management alternatives are shown in figures 1 through 27. The no action alternative for each stand is outlined in figures 1 through 12. Each stand is harvested and regenerated in 20 years, using the seed-tree method, with no regard for SWDM control. In six stands--265-15, 285-15, 286-8, 304-4, 304-7, and 305-5--this alternative leaves a large proportion of infected seed trees; even if these trees are eventually removed, the potential remains for them to serve as sources of infection for seedlings as they become established. Assuming that some seedlings are infected, the growth of the new stands were then projected over the next rotation; these simulations for the two site indices found in the stands are outlined in figures 13 and 14. Not only are the yields per acre significantly reduced compared to healthy stands (see figures 27 and 28), but at the time of the next regeneration cut (age 120), these stands will be so badly infected that natural regeneration will be impossible.

The delayed action alternative simulations are essentially the same as the previous runs; the main difference being that the six heavily infected stands are clearcut and planted at the time of regeneration, rather then using the seed-tree method. This alternative will yield a higher volume at harvest because of the clearcuts, and will also insure healthy regeneration, but it will also require that at least 723 acres in six stands be planted.

The immediate suppression alternative simulation results are listed in figures 15 through 26; each stand is regenerated using a seed-tree cut. The predicted yields for the new, healthy stands are outlined in figures 27 and 28 for the two site indices. These yields are almost the same as for the preceding alternative.

ANALYSIS AND RECOMMENDATION

The following criteria were used to analyze the alternatives:

1. A sufficient number of dwarf mistletoe-free seed trees must be available at the time of the seed-tree harvest. The criteria are met by a .0+ DMR at the age of the seed-tree cut on the appropriate RMYLD printout.

2. The newly regenerated stands must yield an acceptable volume of timber by the end of the next rotation.

3. Regeneration is accomplished using natural or artificial means. Natural regeneration using the shelterwood method is the preferred silvicultural option because it is less expensive and has a higher probability of success than planting. Method of regeneration was considered the most important factor in the analysis.

The following chart displays the results of the analysis:

Alternative	Criteria		
	DM control	Volume	Regeneration
No action	No	9.3 MMBF	Natural
Delayed action	Yes	19.6 MMBF	Artificial
Immediate suppression	Yes	17.0 MMBF	Natural

Because it provides for natural regeneration and controls SWDM while producing yields only slightly less than the delayed action alternative, immediate suppression best fits the criteria and is the recommended alternative.

LITERATURE CITED

Hawksworth, Frank G. 1961. Dwarf mistletoe of ponderosa pine in the Southwest. U.S. Dep. Agr. Tech. Bull. 1246. 112 pp.

Hawksworth, Frank G. 1977. The 6-class dwarf mistletoe rating system. USDA Forest Serv. Gen. Tech. Rep. RM-48, 7 pp. Rocky Mt. Forest and Range Exp. Sta., Fort Collins, Colo.

Edminster, Carleton B. 1978. RMYLD: Computation of yield tables for even-aged and two-storied stands. USDA Forest Serv. Res. Pap. RM-199. 26 pp. Rocky Mt. Forest and Range Exp. Sta., Fort Collins, Colo.

Forest Service Handbook. 1982. Silvicultural examination and prescription handbook, FSH 2409.26d, R-3, Timber Management, Albuquerque, NM.

Minor, Charles O. 1964. Site-index curves for young-growth ponderosa pine in northern Arizona. USDA Forest Serv. Res. Note RM-37. 8 pp. Rocky Mt. Forest and Range Exp. Sta., Fort Collins, Colo.

Schubert, Gilbert H. 1974. Silviculture of southwestern ponderosa pine: the status of our knowledge. USDA Forest Serv. Res. Pap. RM-123. 71 pp. Rocky Mt. Forest and Range Exp. Sta., Fort Collins, Colo.

TABLE 1.--Stand parameters for 12 stands on Jarita Mesa derived from the R-3 Timber Stand Examination Program

Stand No.		Acres	Site index	Mean			Trees acre	% trees infected
				Age	D.b.h.	Height		
265-15	OS[1]	100	55	140	16.0	60	55	60
	US			40	5.0	15	80	44
285-3	OS	308	63	120	14.0	45	60	55
	US			50	5.0	20	56	0
285-7	OS	89	55	120	14.0	40	71	52
	US			50	6.0	25	45	0
285-15	OS	25	55	120	14.0	45	59	64
	US			50	6.0	20	19	0
286-5	OS	208	55	110	14.0	40	65	52
	US			50	5.0	20	66	33
286-8	OS	119	55	100	12.0	40	74	64
	US			40	6.0	25	200	55
304-4	OS	130	55	130	14.0	50	68	78
	US			40	5.0	20	290	64
304-7	OS	110	55	100	13.0	45	74	70
	US			40	6.0	25	254	33
305-4	OS	139	55	120	14.0	40	42	60
	US			50	5.0	15	145	64
305-5	OS	100	55	120	14.0	40	67	78
	US			70	7.0	20	70	80
305-6	OS	118	55	110	14.0	40	58	48
	US			50	5.0	20	124	55
305-10	OS	187	35	120	14.0	55	44	52
	US			50	5.0	15	227	39

[1] OS = overstory, trees $\geq$ 9.1" d.b.h.; US = understory, trees $\leq$ 9.0" d.b.h.

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
BENJI 265-15MF
02/16/83

SITE INDEX= 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .0

		CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME		MERCH. VOLUME		SAWTIMBER VOLUME	TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.	MAI	CU.FT.	MAI	BD.FT.	NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
140	1.1	55	77	16.0	60	1730	12	1650	12	7100							
150	1.9	48	75	16.9	62	1750	12	1670	11	7500							
160	2.7	41	71	17.8	64	1700	11	1640	10	7700							
160	.3	4	6	16.1	59	120		120		500	37	65	17.9	1580	1520	7200	0
170	.7	4	7	18.0	65	160	10	150	10	700							
											TOTAL YIELDS			1740	1670	7900	0

18

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF
MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 140 MAI= 12.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 140 MAI= 12.

FIGURE 1.--RMYLD simulation of the maintain present management alternatives

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
BENJI 285-3NP
02/16/83

SITE INDEX, 63 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .9

		CHARACTERISTICS BEFORE AND AFTER THINNING								PERIODIC INTERMEDIATE CUTS						
STAND AGE YEARS	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT. MAI	MERCH. VOLUME CU.FT. MAI	SAWTIMBER VOLUME BD.FT.		TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	TOTAL VOLUME CU.FT.	MERCH. VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	MERCH. CU.FT. SUBSAWLOG
120	.9	60	64	14.0	45	1060 9	1000 8	3900								
130	1.3	60	75	15.1	48	1320 10	1250 10	5200								
140	2.1	54	76	16.1	50	1420 10	1350 10	5900								
140	.0+	4	4	14.3	45	70	70	300		50	72	16.2	1350	1280	5600	0
150	.2	4	6	16.4	47	100 10	100 9	400								
									TOTAL YIELDS				1450	1380	5600	0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF
MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 130 MAI= 10.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 130 MAI= 10.

FIGURE 2.--RMYLD simulation of the maintain present management alternatives

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
RENJI 285-7NP
02/16/83

SITE INDEX= 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .0

		CHARACTERISTICS BEFORE AND AFTER THINNING								PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME		MERCH. VOLUME		SAWTIMBER VOLUME		TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.	MAI	CU.FT.	MAI	BD.FT.	MAI	NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
120	.8	71	76	14.0	40	1110	9	1040	9	41[illegible]								
130	1.2	71	86	14.9	42	1350	10	1270	10	52[illegible]								
140	2.1	62	83	15.7	44	1380	10	1310	9	56[illegible]								
140	.0+	5	5	13.8	39	70		7[illegible]		3[illegible]		67	79	15.8	1310	1240	5300	0
150	.2	5	7	15.8	41	100	9	100	9	4[illegible]								
												TOTAL YIELDS			1410	1340	5300	0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 130 MAI= 10.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 130 MAI= 10.

FIGURE 3.--RMYLD simulation of the maintain present management alternatives

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
BENJI 285-15NP
02/16/83

SITE INDEX, 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .0

		CHARACTERISTICS BEFORE AND AFTER THINNING								PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME		MERCH. VOLUME		SAWTIMBER VOLUME	TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.	MAI	CU.FT.	MAI	BD.FT.	NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
120	1.3	59	63	14.0	45	1040	9	990	8	3910							
130	2.1	51	63	15.1	47	1110	9	1050	8	4410							
140	2.9	43	62	16.2	49	1140	8	1080	8	4700							
140	.5	4	5	14.5	44	70		70		310	39	57	16.4	1070	1010	4400	0
150	.9	4	6	16.8	46	110	8	100	7	510							
											TOTAL YIELDS			1180	1110	4900	0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 120 MAI= 8.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 120 MAI= 9.

FIGURE 4.--RMYLD simulation of the maintain present management alternatives

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
BENJI 28[illegible]-SNP
02/16/83

SITE INDEX= 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- [illegible].0 SUBSEQUENT- .0

		CHARACTERISTICS BEFORE AND AFTER THINNING								PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME	MAI	MERCH. VOLUME	MAI	SAWTIMBER VOLUME	TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.		CU.FT.		BD.FT.	NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
110	.8	65	69	14.0	40	1010	9	950	9	38[illegible]							
120	1.2	65	80	15.0	43	1260	10	1190	10	49.[illegible]							
130	2.0	57	79	15.9	45	1320	10	1250	11	54[illegible]							
130	.8*	5	5	14.2	40	80		80		3 [illegible]	52	74	16.2	1247	1170	5100	0
140	.2	5	7	16.4	42	110	10	110	9	.5 [illegible]							
										TOTAL YIELDS				1359	1280	5600	0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
1. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF MORE THAN 1. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 120 MAI= 10.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 120 MAI= 10.

FIGURE 5.--RMYLD simulation of the maintain present management alternatives

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
BENJI 286-BNP
02/16/83

SITE INDEX, 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .0

		CHARACTERISTICS BEFORE AND AFTER THINNING								PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME	MERCH. VOLUME		SAWTIMBER VOLUME	TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.	CU.FT.	MAI	BD.FT.	NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
100	1.3	74	58	12.0	40	830	760	8	2700							
110	2.1	64	57	12.8	43	890	830	8	3100							
120	3.0	53	53	13.6	46	890	840	7	3200							
120	.6	6	5	11.9	41	70	60		200	47	48	13.7	820	780	3000	0
130	1.0	6	6	13.4	43	90	80	7	300							
										TOTAL YIELDS			910	870	3000	0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF
MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 100 MAI= 8.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 100 MAI= 8.

FIGURE 6.--RMYLD simulation of the maintain present management alternatives

YIELDS PER ACRE -- OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
RENJI 304-4NF
02/16/83

SITE INDEX= 65 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 50.0 SUBSEQUENT- .0

		CHARACTERISTICS BEFORE AND AFTER THINNING								PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME		MERCH. VOLUME		SAWTIMBER VOLUME	TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.	MAI	CU.FT.	MAI	BD.FT.	NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
130	2.2	68	73	14.0	50	1340	10	1260	10	5000							
140	3.0	56	66	14.7	52	1280	9	1210	9	4900							
150	3.8	44	58	15.5	54	1160	8	1100	7	4700							
150	1.3	5	5	13.9	49	90		80		300	39	53	15.8	1070	1010	4400	0
160	2.1	5	7	15.5	51	120	7	120	7	500							
										TOTAL YIELDS				1190	1130	4950	0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF
MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 4.0
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 130 MAI= 10.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 130 MAI= 10.

FIGURE 7.--RMYLD simulation of the maintain present management alternatives

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
BENJI 304-7AF
02/16/83

SITE INDEX= 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .3

		CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS					
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME	MERCH. VOLUME		SAWTIMBER VOLUME		TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.	CU.FT.	MAI	BD.FT.	MAI	NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
100	1.6	74	68	13.0	45	1120	11	1040	10	39[illegible]							
110	2.4	63	64	13.7	48	1140	10	1070	10	42[illegible]							
120	3.3	51	58	14.4	51	1080	9	1020	9	41[illegible]							
120	.9	6	5	12.8	46	90		80		3[illegible]	45	53	14.7	990	940	3800	0
130	1.3	6	7	14.3	48	120	9	110	8	4[illegible]0							
											TOTAL YIELDS			1110	1050	3800	0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF
MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 4.1.
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 100 MAI= 10.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 100 MAI= 11.

FIGURE 8.--RMYLD simulation of the maintain present management alternatives

YIELDS PER ACRE . . OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
BENJI 305-4NP
02/16/83

SITE INDEX, 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .7

CHARACTERISTICS BEFORE AND AFTER THINNING											PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME		MERCH. VOLUME		SAWTIMBER VOLUME	TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.	MAI	CU.FT.	MAI	BD.FT.	NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
120	1.1	42	45	14.0	40	650	5	610	5	24[illegible]							
130	1.8	37	46	15.1	42	720	6	68[illegible]	5	29[illegible]							
140	2.6	31	44	16.2	44	730	5	7[illegible]	5	3[illegible]							
140	.3	4	5	14.7	40	70		6[illegible]		3[illegible]	27	39	14.3	66[illegible]	64[illegible]	2700	0
150	.7	4	6	16.3	42	90	5	8[illegible]	5	4[illegible]							
											TOTAL YIELDS			75[illegible]	72[illegible]	2700	0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 120 MAI= 5.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 130 MAI= 6.

FIGURE 9.--RMYLD simulation of the maintain present management alternatives

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
BENJI 305-5NP
02/16/83

SITE INDEX, 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .0

		CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME		MERCH. VOLUME		SAWTIMBER VOLUME	TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.	MAI	CU.FT.	MAI	BD.FT.	NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
120	2.2	67	72	14.0	40	1050	9	980	8	3900							
130	3.0	55	67	14.9	42	1040	8	980	8	4010							
140	3.8	44	60	15.8	44	980	7	930	7	4010							
140	1.3	5	5	14.2	40	80		70		300	39	55	16.1	900	860	3700	0
150	2.1	5	7	16.0	41	110	7	100	6	400							
											TOTAL YIELDS			1010	960	3700	0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF
MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED = 4.0.
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 120 MAI= 8.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 120 MAI= 9.

FIGURE 10.--RMYLD simulation of the maintain present management alternatives

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
BENJI 305-6NP
02/16/83

SITE INDEX= 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .0

	CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS						
STAND AGE YEARS	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MAI	MERCH. VOLUME CU.FT.	MAI	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	TOTAL VOLUME CU.FT.	MERCH. VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	MERCH. CU.FT. SUBSAWLOG
110	.7	58	62	14.0	40	900	8	870	8	34							
120	1.1	58	71	15.0	43	1120	9	1060	9	44							
130	1.9	51	70	15.9	45	1180	9	1120	9	48							
130	.0+	5	5	14.2	40	80		80		3[illegible]	46	65	16.1	11[illegible]	10[illegible]	4500	0
140	.2	5	7	16.1	42	110	9	1[illegible]	8	5[illegible]							
										TOTAL YIELDS				12[illegible]	11[illegible]	5000	0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
1. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF MORE THAN 1. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.1.
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 120 MAI= 9.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 120 MAI= 9.

FIGURE 11.--RMYLD simulation of the maintain present management alternatives

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
BENJI 305-10AP
02/16/83

SITE INDEX= 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .0

	CHARACTERISTICS BEFORE AND AFTER THINNING										PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME		MERCH. VOLUME		SAWTIMBER VOLUME	TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.	MAI	CU.FT.	MAI	BD.FT.	NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
120	.8	44	47	14.0	55	960	8	900	8	3600							
130	1.2	44	54	15.0	57	1160	9	1090	8	4500							
140	1.9	39	53	15.8	59	1180	8	1120	8	4800							
140	.6+	5	5	14.2	55	110		10		400	34	48	16.1	1070	1020	4400	0
150	.2	5	7	16.0	57	150	8	140	8	600							
											TOTAL YIELDS			1220	1160	5000	0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 120 MAI= 8.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 130 MAI= 9.

FIGURE 12.--RMYLD simulation of the maintain present management alternatives

YIELDS PER ACRE - OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
BENJI DE SI
02/16/83

SITE INDEX, 50 FT. 2-YEAR TIME MEASUREMENT INTERVAL
THINNING INTENSITY-- INITIAL- 35. SUBSEQUENT- 35.

STAND AGE		TREES	BASAL AREA	AVE AGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME		PERIODIC INTERMEDIATE CUTS: TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	D.M.R.	NO.	SQ.FT.	IN.	FT.	CU.FT. MAI	CU.FT. MAI	BD.FT.		NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
20	.6	700	4	1.0	10	390	20	0	0							
20	.7	374	7	1.3	11	210		0		326	1	.7	180	0	0	0
30	.9	371	23	3.8	18	370	19	0								
40	1.4	368	48	4.9	24	590	19	120	3							
40	1.4	368	48	4.9	24	590		120			0	.0	0	0	0	0
50	2.4	366	52	5.6	31	710	18	420	6							
60	3.3	243	51	6.2	38	760	16	420	7							
60	2.9	166	34	6.5	38	570		340		77	13	5.6	190	60	0	60
70	3.8	130	38	7.3	44	610	14	420	7							
80	4.7	97	34	8.0	48	580	12	470	7							
80	4.7	97	34	8.0	48	580		470			0	.0	0	0	0	0
90	5.1	69	28	8.7	51	510	12	430	6	3						
100	5.5	48	22	9.3	53	420	8	370	4	4						
100	5.1	32	13	8.5	51	230		130		1	16	13	17.7	190	180	300	100
110	5.4	23	11	9.5	52	210	7	180	4	2						
120	5.7	16	9	10.3	54	180	6	160	3	3						
120	4.1	6	2	8.7	36	40		40			10	7	11.3	140	120	300	40
130	4.9	5	3	11.0	52	60	5	70	3	2						
140	5.3	4	4	12.8	57	70	5	60	3	2						
										TOTAL YIELDS	77	420	6.0	220		

MERCH. CU. FT. - TREES 5.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
20. CUBIC FEET AND 100. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 1000. BF/ACRE IF MORE THAN 2. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 6.0
DWARF MISTLETOE INFECTION STARTED AT AGE 20.

FIGURE 13.--RMYLD simulation of infected, new stands

YIELD PER ACRE OF SOUTHWESTERN PONDEROSA PINE - ARIZONA

RENJI 68 SI

12/13/85

SITE INDEX. [illegible] FT. [illegible]-YEAR THINNING INTERVAL

THINNING INTENSITY-- INITIAL- [illegible]% SUBSEQUENT- [illegible]%

	CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS						
STAND AGE YEARS	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MAI	MERCH. VOLUME CU.FT.	MAI	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	TOTAL VOLUME CU.FT.	MERCH. VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	MERCH. CU.FT. SUBSAWLOG
20	.1	708	4	1.0	10	390	20										
25	.7	272	3	1.5	11	210					436	1	.7	180	0	0	0
30	.9	371	31	3.5	19	780	19										
40	1.4	367	56	5.4	27	640	20	140	5								
40	1.4	367	56	5.2	27	640		140			0	0	.0	0	0	0	0
50	2.3	317	58	5.8	34	830	20	170	7								
60	3.2	262	67	6.5	41	960	19	6[illegible]	1[illegible]								
60	2.6	156	41	6.9	42	650		45[illegible]			106	19	5.7	310	150	0	150
70	3.5	128	42	7.8	44	740	17	500	17								
80	4.3	101	41	8.6	53	760	16	640	1	4[illegible]							
80	4.3	101	41	8.6	53	760		640		4[illegible]	0	0	.0	0	0	0	0
90	5.0	76	36	9.3	56	700	13	520	9	8[illegible]							
100	5.5	55	28	9.9	58	610	11	540	7	10[illegible]							
100	5.[illegible]	38	17	9.1	57	[illegible]4		[illegible]		[illegible]	17	12	11.4	270	240	700	60
110	5.5	28	13	11.[illegible]	58	32[illegible]	10	2[illegible]	8	6[illegible]							
120	5.[illegible]	26	13	10.9	6[illegible]	28[illegible]	9	[illegible]	[illegible]	6[illegible]							
120	4.[illegible]	7	3	9.2	5[illegible]	6[illegible]		5[illegible]		1[illegible]	13	10	11.2	220	190	500	60
130	5.[illegible]	6	4	11.4	58	[illegible]	8	[illegible]	[illegible]	3[illegible]							
140	5.4	5	3	13.1	61	1[illegible]	8	1[illegible]	5	4[illegible]							
											TOTAL YIELDS			1[illegible]	680	1[illegible]	270

MERCH. CU. FT. - TREES 5.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 1[illegible].[illegible] INCHES D.B.H. AND LARGER TO MERCHANTABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
2[illegible] CUBIC FEET AND 1[illegible] BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 1[illegible],000 BF/ACRE IF
MORE THAN [illegible]% OF MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.B.H. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - [illegible].
DWARF MISTLETOE INFECTION STARTING AT AGE [illegible].

FIGURE 14.--RMYLD simulation of infected, new stands

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
BENJI 265-15
12/16/83

SITE INDEX, 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .0

CHARACTERISTICS BEFORE AND AFTER THINNING

STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME	MAI	MERCH. VOLUME	MAI	SAWTIMBER VOLUME
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.		CU.FT.		BD.FT.
140	1.1	55	77	16.0	60	1730	12	1650	12	71
140	.1+	5	5	14.2	55	110		100		4
150	.2	5	7	16.3	57	150	12	150	11	6

PERIODIC INTERMEDIATE CUTS

TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
50	70	16.2	1620	1550	6700	0
TOTAL YIELDS			1770	1700	7300	0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF
MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 140 MAI= 12.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 140 MAI= 12.

FIGURE 15.--RMYLD simulation of the immediate action alternative

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
BENJI 280-3
02/16/83

SITE INDEX= 63 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 50.0 SUBSEQUENT- .0

		CHARACTERISTICS BEFORE AND AFTER THINNING								PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME		MERCH. VOLUME		SAWTIMBER VOLUME	TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.	MAI	CU.FT.	MAI	BD.FT.	NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
120	.9	60	64	14.0	45	1060	9	1000	8	3900							
120	.J+	6	5	12.2	40	70		60		200	54	59	14.2	990	940	3700	0
130	.2	6	7	14.5	43	110	8	100	8	400							
											TOTAL YIELDS			1100	1040	3700	20

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF
MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 120 MAI= 8.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 120 MAI= 9.

FIGURE 16.--RMYLD simulation of the immediate action alternative

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
BENJI 28S-7
02/16/83

SITE INDEX, 55.EI. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .7

		CHARACTERISTICS BEFORE AND AFTER THINNING								PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME		MERCH. VOLUME		SAWTIMBER VOLUME	TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.	MAI	CU.FT.	MAI	BD.FT.	NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
120	.8	71	76	14.0	40	1110	9	1040	9	4100							
120	.0+	6	5	12.1	35	60		50		200	65	71	14.2	1050	990	3900	0
130	.2	6	7	14.3	37	90	9	80	8	300							
											TOTAL YIELDS			1140	1070	3900	20

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 120 MAI= 9.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 120 MAI= 9.

FIGURE 17.--RMYLD simulation of the immediate action alternative

YIELDS PER ACRE ... OF SOUTHWESTERN PONDEROSA PINE ... - OVERSTORY
BENJI 285-15
02/16/83

SITE INDEX, 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .0

		CHARACTERISTICS BEFORE AND AFTER THINNING								PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME CU.FT.	MAI	MERCH. VOLUME CU.FT.	MAI	SAWTIMBER VOLUME BD.FT.	TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME CU.FT.	MERCH. VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	MERCH. CU.FT. SUBSAWLOG
YEARS	DMR	NO.	SQ.FT.	IN.	FT.						NO.	SQ.FT.	IN.				
120	1.3	59	63	14.0	45	1040	9	980	8	39							
120	.0+	6	5	12.2	40	70		5[illegible]		2	53	58	14.2	970	920	3700	0
130	.2	6	7	14.7	42	110	8	1[illegible]0	8	4							
											TOTAL YIELDS			1081	1020	3700	20

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF
MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3..
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 120 MAI= 8.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 120 MAI= 9.

FIGURE 18.--RMYLD simulation of the immediate action alternative

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
BENJI 285-5
02/16/83

SITE INDEX= 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .0

		CHARACTERISTICS BEFORE AND AFTER THINNING								PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME		TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT. MAI	CU.FT. MAI	BD.FT.		NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
110	.8	65	69	14.0	40	1010	9	95	3	38						
110	.0+	6	5	12.2	35	60		50		2	59	64	14.1	950	900	3600	0
120	.2	6	7	14.6	38	100	9	9	8	4						
										TOTAL YIELDS				1050	900	3600	0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
1. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF MORE THAN 1. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 110 MAI= 9.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 110 MAI= 9.

FIGURE 19.--RMYLD simulation of the immediate action alternative

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
BENJI 286-8
02/16/83

SITE INDEX, 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .0

		CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME		MERCH. VOLUME		SAWTIMBER VOLUME	TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.	MAI	CU.FT.	MAI	BD.FT.	NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
100	1.3	74	58	12.0	40	830	8	760	8	27.0							
100	.0+	8	5	10.4	35	60		5[illegible]		1[illegible]	66	53	12.1	770	710	2600	90
110	.2	8	6	12.1	38	90	8	8[illegible]	7	3[illegible]							
											TOTAL YIELDS			860	790	2600	90

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF
MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 100 MAI= 8.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 100 MAI= 8.

FIGURE 20.--RMYLD simulation of the immedaite action alternative

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
RENJ. 304-4
02/16/83

SITE INDEX. 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .1

	CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME		MERCH. VOLUME		SAWTIMBER VOLUME	TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.	MAI	CU.FT.	MAI	BD.FT.	NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
130	2.2	68	73	14.0	50	1340	10	1260	1	50							
130	.0+	6	5	12.2	45	80		70		3	62	68	14.2	1260	1190	4700	0
140	.2	6	6	13.9	47	110	10	100	9	400							
											TOTAL YIELDS			1370	1290	4790	0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 130 MAI= 10.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 130 MAI= 10.

FIGURE 21.--RMYLD simulation of the immediate action alternative

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
PENJI 304-7
02/16/83

SITE INDEX, 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .0

		CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME		MERCH. VOLUME		SAWTIMBER VOLUME	TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.	MAI	CU.FT.	MAI	BD.FT.	NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
100	1.6	74	68	13.0	45	1120	11	1040	10	3910							
100	.0+	7	5	11.2	40	70		60		210	67	63	13.1	1050	980	3700	0
110	.2	7	6	12.8	43	100	10	90	10	310							
											TOTAL YIELDS			1150	1070	3700	0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF
MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 100 MAI= 10.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 100 MAI= 11.

T291

FIGURE 22.--RMYLD simulation of the immediate action alternative

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
PENJI 305-4
02/16/83

SITE INDEX, 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .0

CHARACTERISTICS BEFORE AND AFTER THINNING

STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME	MAI	MERCH. VOLUME	MAI	SA.TIMBER VOLUME	TREES
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.		CU.FT.		BD.FT.	NO.
120	1.1	42	45	14.0	40	650	5	610	5	24[illegible]	
120	.0+	6	5	12.5	35	60		[illegible]		2	36
130	.2	6	7	14.3	38	90	5	80	5	[illegible]	

PERIODIC INTERMEDIATE CUTS

BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
40	14.3	590	550	2200	0

TOTAL YIELDS 681 640 2200 0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF
MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.5.
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 120 MAI= 5.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 120 MAI= 5.

FIGURE 23.--RMYLD simulation of the immediate action alternative

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
RENJI 305-5
02/16/83

SITE INDEX= 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .0

		CHARACTERISTICS BEFORE AND AFTER THINNING								PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME		MERCH. VOLUME		SAWTIMBER VOLUME	TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.	MAI	CU.FT.	MAI	BD.FT.	NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
120	2.2	67	72	14.0	40	1050	9	98[illegible]	8	39[illegible]							
120	.0+	6	5	12.2	35	60		5[illegible]		2[illegible]	61	67	14.2	990	930	3700	[illegible]
130	.2	6	7	14.4	37	90	8	[illegible]	8	3[illegible]							
										TOTAL YIELDS				1080	1020	3700	0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF
MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 120 MAI= 8.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 120 MAI= 9.

FIGURE 24.--RMYLD simulation of the immediate action alternative

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
BENJI 309-6
02/16/83

SITE INDEX, 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .0

		CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME		MERCH. VOLUME		SAWTIMBER VOLUME	TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CV.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.	MAI	CU.FT.	MAI	BD.FT.	NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
110	.7	58	62	14.0	40	900	8	850	8	3400							
110	.0+	6	5	12.3	35	60		6		0	52	57	14.2	840	790	3200	0
120	.2	6	7	14.4	38	90	8	90	7	400							
											TOTAL YIELDS			931	881	3200	0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
1. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF MORE THAN 1. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.0.
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 110 MAI= 8.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 110 MAI= 8.

FIGURE 25.--RMYLD simulation of the immediate action alternative

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - OVERSTORY
BENJI 305-10
02/16/83

SITE INDEX= 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 5.0 SUBSEQUENT- .4

		CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS						
STAND AGE		TREES	BASAL AREA	AVERAGE D.B.H.	AVERAGE HEIGHT	TOTAL VOLUME		MERCH. VOLUME		SAWTIMBER VOLUME	TREES	BASAL AREA	AVERAGE D.B.H.	TOTAL VOLUME	MERCH. VOLUME	SAWTIMBER VOLUME	MERCH. CU.FT.
YEARS	DMR	NO.	SQ.FT.	IN.	FT.	CU.FT.	MAI	CU.FT.	MAI	BD.FT.	NO.	SQ.FT.	IN.	CU.FT.	CU.FT.	BD.FT.	SUBSAWLOG
120	.8	44	47	14.0	55	960	8	900	8	3600							
120	.0+	6	5	12.4	50	90		80		300	38	42	14.2	870	820	3300	0
130	.2	6	7	14.4	53	130	8	120	7	500							
											TOTAL YIELDS			1000	940	3800	0

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
0. CUBIC FEET AND 500. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 500. BF/ACRE IF
MORE THAN 0. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING FROM ABOVE ALLOWED IN STANDS WITH DWARF MISTLETOE.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 3.5.
ALL THINNINGS MAY BE NONCOMMERCIAL.
CULMINATION OF M.A.I. MERCH. CU. FT.--AGE= 120 MAI= 8.
CULMINATION OF M.A.I. TOTAL CU. FT.--AGE= 120 MAI= 8.

FIGURE 26.--RMYLD simulation of the immediate action alternative

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - UNTHINNED
BENJI 55 SI
02/16/83

SITE INDEX, 55 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 30.0 SUBSEQUENT- 40.0

		CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS						
STAND AGE YEARS	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MAI	MERCH. VOLUME CU.FT.	MAI	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	TOTAL VOLUME CU.FT.	MERCH. VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	MERCH. CU.FT. SUBSAWLOG
20	.0	699	4	1.0	10	390	20										
20	.0	373	3	1.3	11	210					326	1	.7	180	0	0	0
30	.	372	29	3.8	18	370	18										
40	.0	369	48	4.5	24	590	19	180	4								
40	.0	369	48	4.9	24	590		180			0	0	.0	0	0	0	0
50	.0	361	62	5.6	31	840	20	340	7								
60	.0	351	74	6.2	38	1110	21	610	10								
60	.0	183	49	7.0	39	730		510			168	25	5.2	380	100	0	100
70	.0	181	59	7.7	45	960	22	750	12								
80	.0	179	69	8.4	49	1220	22	1020	14	8							
80	.0	134	58	8.9	50	1020		840		8	45	11	6.7	200	140	0	140
90	.0	133	68	9.7	54	1300	23	1160	15	20							
100	.0	130	78	10.5	58	1620	24	1470	17	36							
100	.0	46	36	12.0	59	780		720		26	84	42	9.6	840	750	1300	520
110	.0	46	44	13.3	62	1030	24	960	15	37							
120	.0	46	53	14.5	65	1280	24	1210	18	49							
120	.0	4	7	17.9	69	180		180		8	42	46	14.2	1100	1030	4100	0
130	.0	4	9	20.4	71	250	23	240	17	12							
140	.0	4	11	22.8	73	320	21	310	17	19							
											TOTAL YIELDS			5020	2330	9300	760

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
20. CUBIC FEET AND 1000. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 1000. BF/ACRE IF MORE THAN 20. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING MUST BE FROM BELOW.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 6.0.
PRECOMMERCIAL INITIAL THINNING ALLOWED. NONCOMMERCIAL SUBSEQUENT THINNINGS

FIGURE 27.--RMYLD simulation of healthy, new stands

YIELDS PER ACRE OF SOUTHWESTERN PONDEROSA PINE - UNDERSTORY
RENJI 63 SI
02/15/83

SITE INDEX, 63 FT. 20-YEAR THINNING INTERVAL
THINNING INTENSITY-- INITIAL- 35.0 SUBSEQUENT- 0.0

STAND AGE		CHARACTERISTICS BEFORE AND AFTER THINNING									PERIODIC INTERMEDIATE CUTS						
YEARS	DMR	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	AVERAGE HEIGHT FT.	TOTAL VOLUME CU.FT.	MAI	MERCH. VOLUME CU.FT.	MAI	SAWTIMBER VOLUME BD.FT.	TREES NO.	BASAL AREA SQ.FT.	AVERAGE D.B.H. IN.	TOTAL VOLUME CU.FT.	MERCH. VOLUME CU.FT.	SAWTIMBER VOLUME BD.FT.	MERCH. CU.FT. SUBSAWLOG
20	.0	699	4	1.0	10	390	20	0		0							
20	.0	373	3	1.3	11	210		0		0	326	1	.7	180	0	0	0
30	.0	372	31	3.8	19	390	19	0		0							
40	.0	363	49	5.0	27	630	20	210	5	0							
40	.0	363	49	5.0	27	630		210		0	0	0	.0	0	0	0	0
50	.0	357	68	5.9	35	870	23	460	9	0							
60	.0	345	82	6.6	42	1320	25	850	14	0							
60	.0	169	52	7.5	43	830		630		0	176	30	5.6	490	220	0	220
70	.0	167	63	8.3	49	1110	25	820	16	4							
80	.0	165	73	9.0	55	1400	26	1210	18	16							
80	.0	118	59	9.6	55	1160		1020		16	47	14	7.4	240	190	0	190
90	.0	117	69	10.4	60	1490	27	1340	18	32							
100	.0	115	77	11.2	64	1830	27	1670	21	53							
100	.0	40	36	12.8	65	860		810		37	75	43	10.3	970	870	2300	360
110	.0	40	43	14.0	69	1100	27	1030	21	41							
120	.0	39	49	15.2	72	1320	27	1250	21	52							
120	.0	4	8	18.6	76	220		210		10	35	41	14.7	1100	1040	4200	0
130	.0	4	10	21.0	78	290	25	280	20	15							
140	.0	4	12	23.2	80	360	24	350	19	29							
											TOTAL YIELDS			334	2670	8500	770

MERCH. CU. FT. - TREES 6.0 INCHES D.B.H. AND LARGER TO 4.0-INCH TOP.
BD. FT. - TREES 10.0 INCHES D.B.H. AND LARGER TO VARIABLE TOP LIMIT.
MINIMUM REMOVALS FOR INCLUSION IN TOTAL YIELDS--
20. CUBIC FEET AND 100. BOARD FEET PER ACRE.
SAWTIMBER TOTAL YIELD INCLUDES REMOVALS LESS THAN 1,00. BF/ACRE IF MORE THAN 20. MERCH. CF/ACRE WAS REMOVED.
INITIAL THINNING MUST BE FROM BELOW.
D.M.R. ABOVE WHICH PERIODIC THINNINGS WILL NOT BE EXECUTED - 6..
PRECOMMERCIAL INITIAL THINNING ALLOWED. NONCOMMERCIAL SUBSEQUENT THINNINGS

FIGURE 28.--RMYLD simulation of healthy, new stands